International Journal of Maxillofacial Prosthetics (iJMP)

CASE REPORT

Interdisciplinary management of a patient with medication-related osteonecrosis of the jaw: A clinical report

Islam E. Ali, BDS, MDS[1,2], Yuka Sumita, DDS, PhD[1*], Noriko Hatano, DDS, PhD[1], Moe Kosaka, DDS, PhD[3], Kazuto Hoshi, MD, PhD[4], Noriyuki Wakabayashi, DDS, PhD[1]

[1]Department of Advanced Prosthodontics, Graduate School, Tokyo Medical and Dental University, Tokyo, Japan.
[2]Department of Prosthodontics, Faculty of Dentistry, Mansoura University, Mansoura, Egypt.
[3]Division of Dental and Digital Forensics, Graduate School, Tohoku University, Miyagi, Japan.
[4]Department of Oral-maxillofacial Surgery, Dentistry and Orthodontics, University of Tokyo Hospital, Tokyo, Japan.

ABSTRACT

Medication-related osteonecrosis of the jaw (MRONJ) can be induced by Bisphosphonates (BRONJ), Denosumab, and other antiresorptive or antiangiogenic medications. The number of affected patients with MRONJ is increasing worldwide including in Japan. The treatment often includes surgical resection of necrotic bone and the resulting oral defect impairs oral functions which requires consultation with a maxillofacial prosthodontist before and after surgery for prosthetic rehabilitation. Therefore, there is an urgent need to improve collaboration among different institutions for better patient care. In this report, we emphasize the benefits of such collaboration during the treatment of a female patient with BRONJ in the right maxilla. This patient had breast cancer and received zoledronic acid therapy for the treatment of metastatic osseous lesions. The successful team-based collaboration allowed early restoration of oral functions after surgery using an immediate surgical obturator as well as after delivery of the definitive prosthesis. *(Int J Maxillofac Prosthetics 2023;6:16-19)*

Keywords

Antiresorptive agents, bisphosphonate-related osteonecrosis of the jaw, maxillectomy, obturator prosthesis.

AUDIOABSTRACT

ARTICLE INFO

Corresponding Author:

Dr. Yuka Sumita

Department of Advanced Prosthodontics, Tokyo Medical and Dental University, 1-5-45 Yushima Bunkyo-Ku, Tokyo 113-8549, Japan.

Phone :+81-358-034757

Email: yuka.mfp@tmd.ac.jp

Received: 09 January 2023
Accepted: 07 February 2023

INTRODUCTION

Maxillofacial prosthetic rehabilitation of patients with acquired or congenital defects can improve masticatory function, articulation, swallowing, and esthetics.[1] The Clinic of Maxillofacial Prosthetics at the Dental Hospital of Tokyo Medical and Dental University (TMDU) continues to support patients with maxillofacial defects by providing collaborative prosthetic and surgical treatment.[2] Recently, there has been an upsurge in the number of patients presenting to our clinic with medication-related osteonecrosis of the jaw (MRONJ). After Japan became a super-aging society, MRONJ cases increased nationwide, and osteoporosis was the primary disease for many patients.[3]

MRONJ can be induced by a variety of antiresorptive or antiangiogenic medications including bisphosphonates (BRONJ), denosumab, and other agents.[4] The 2017 position paper,[5] published by the Japanese Allied Committee on Osteonecrosis of the Jaw described the new diagnostic definition for MRONJ and proposed how MRONJ can be managed by physicians, dentists, and oral and maxillofacial surgeons.

The 2017 position paper on MRONJ,[5] recommended a disease-stage-specific treatment approach with medical–dental collaboration. However, regardless of the disease stage, isolated sequestrate must be removed to promote the healing of soft tissue and to prevent further development of ONJ.[6] The resulting oral

Articles published in Int J Maxillofac Prosthetics are licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

defect impairs oral functions, and maxillofacial prosthodontists should be consulted before surgery for planning the prosthetic reconstruction, usually using an obturator prosthesis.[7]

This clinical report describes the prosthetic rehabilitation of a patient with MRONJ after surgical resection of necrotic bone in the maxilla. The prosthodontic team planned and fabricated the immediate surgical obturator (ISO) before surgery and after consultation with the oral surgeons. It is hoped that this report will contribute to the treatment of MRONJ by emphasizing the need for patient-centered team-based care throughout the different phases of treatment.

CASE REPORT

A 47-year-old female patient was referred to the Department of Oral Surgery, Tokyo University Hospital, for the evaluation and treatment of right maxillary, stage II BRONJ[5] (Fig 1). The patient had been diagnosed with breast cancer and treated by mastectomy and postoperative radiation. She started intravenous treatment with zoledronic acid (Zometa 4 mg per 5 mL; Novartis Pharma) for the treatment of metastatic osseous lesions of the disseminated breast cancer. After three uneventful years, the patient developed facial swelling, and bleeding from the distal part of the right maxillary gingiva occurred with right maxillary sinusitis. Zoledronic acid therapy was withdrawn for three months before extraction of the right maxillary first premolar. After one year of restarting the Zoledronic acid therapy, right-sided facial swelling occurred, therefore, it was withdrawn for another 3 months and high-pressure irrigation of the maxillary sinus through the right nasal cavity was performed.

Fig 1. Stage II maxillary bisphosphonate-related osteonecrosis of the jaw with bone exposure and inflamed soft tissues.

In 2012, right maxillary BRONJ was diagnosed at a local dental clinic and the patient was referred to the Department of Oral Surgery at Tokyo University Hospital, where she could also visit the otorhinolaryngology department. The remaining right maxillary second premolar was extracted, and irrigation of the maxillary sinus was performed with antibiotic administration (clarithromycin and cefcapene pivoxil hydrochloride hydrate). Although the patient had no symptoms, she was referred to the medical hospital at TMDU for hyperbaric oxygenation (HBO), due to painless bone exposure, facial swelling, and continued pus discharge. The patient underwent 33 HBO sessions at the medical hospital of TMDU. However, the condition was not resolved, and surgical resection of the necrotic bone was planned.

Prior to the surgical operation, the patient was referred by the Department of Oral and Maxillofacial Surgery of Tokyo University Hospital to the Maxillofacial Prosthetics Clinic at TMDU for preoperative examination and ISO fabrication. In 2013, the Surgery was performed at Tokyo University Hospital in the presence of the maxillofacial prosthodontists from TMDU. Immediately after surgery, the ISO was evaluated in the patient mouth and necessary modifications were determined by the maxillofacial prosthodontists (Fig 2).

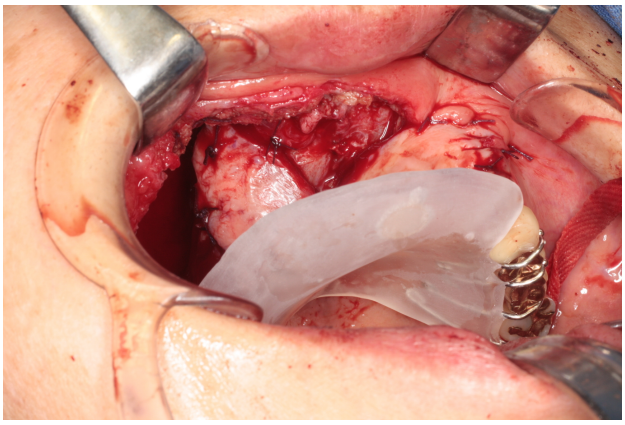

Fig 2. Trial fitting of immediate surgical obturator.

The ISO was modified by a tissue conditioner (Coe-Comfort; GC America, Alsip, IL) to fit the shape of the defect (Fig 3) and was finally inserted to cover the surgical site using the remaining teeth for retention in the operation room at Tokyo University Hospital (Fig 4). Ten days later, the ISO was adjusted at the Maxillofacial Prosthetics Clinic at TMDU while the patient was an inpatient at Tokyo University Hospital. Several adjustments of the ISO were performed later at our clinic to accommodate soft tissues changes. After sufficient healing, an oroantral communication in the right maxillary region was evident (Fig 5). The interim and later the definitive obturators were fabricated with great caution to avoid triggering BRONJ.[7] An alternate treatment option, such as an implant-supported fixed dental prosthesis, was rejected because of the

need for bone augmentation and the inherent risk of recurring BRONJ.[8] Marked improvement in oral functions resulting from the placement of the obturator was subjectively confirmed (Fig 6). Esthetic outcomes for the lips were favorable, and facial harmony was achieved by adjusting the obturator several times.

The patient was monitored closely for the following 3 months, and no mucosal lesions were detected. To prevent denture-induced trauma and BRONJ reactivation from uneven occlusal force distribution, the denture base was relined periodically. She was instructed to keep the prosthesis out of her mouth for at least 12 hours a day and to clean the defect and prosthesis regularly. No clinical or radiological signs of recurrent BRONJ have been seen after 9 years. The patient's oral functions and esthetic expectations were satisfactorily met.

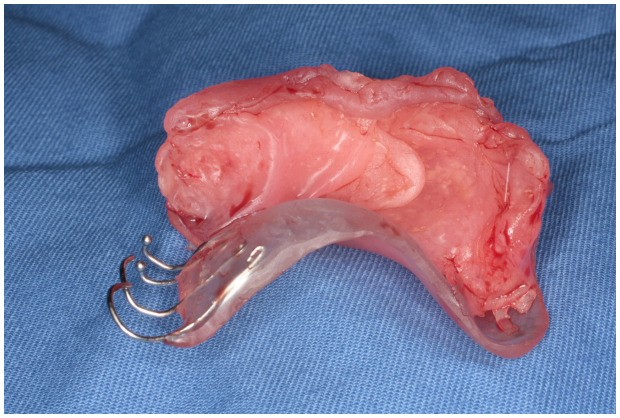

Fig 3. Modification of immediate surgical obturator by tissue conditioner.

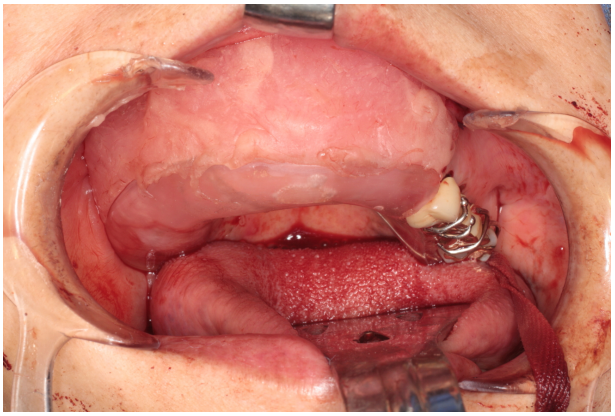

Fig 4. Insertion of immediate surgical obturator.

DISCUSSION

The treatment of MRONJ varies depending on the stage of disease. The three key points for treating osteonecrosis are (1) preventing the extension of the necrotic area, (2) relieving the symptoms (e.g., pain, discharge of pus, and dysesthesia) and infection control, and (3) patient education and routine follow-up for oral health care by dental specialists.[5] Therefore, medical–dental collaboration is central to the successful treatment of patients with MRONJ. However, according to a previous study, 62% of doctors had never asked a dentist to examine their patients before antiresorptive therapy, and 72% of doctors had never worked with local dentists.[9] These findings show that doctors and dentists cannot effectively communicate about MRONJ treatment.

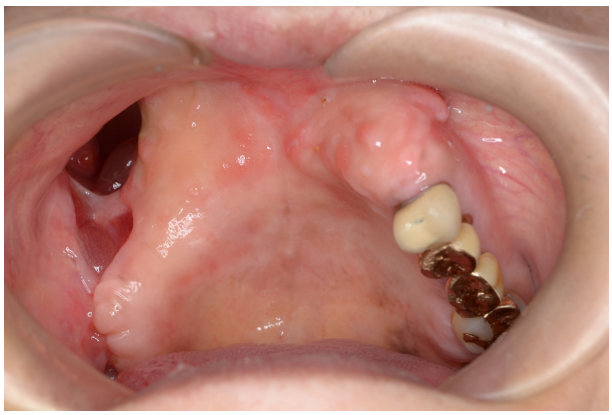

Fig 5. Clinical image of oroantral communication after wound healing with no signs of sinus discharge or inflammation.

Fig 6. Intraoral view of definitive obturator prosthesis.

In this case, communication between the two university hospitals went smoothly, making it easy to support our patient. It can be discussed as follows: many cases were previously shared and collaborated on. These experiences improved the level of communication, which became more familiar to the members of two different departments at two different universities. Additionally, model sharing, patient visits, and maxillofacial prosthodontist visits were easy due to the short distance between the two hospitals.

Unfortunately, there are not enough maxillofacial prosthodontists worldwide. Therefore, it is necessary to develop a method of sharing the various maxillofacial prosthetic techniques and an educational system to facilitate such communication. Furthermore, telemedicine is critical for overcoming the problem of long distances between institutions. Because MRONJ necessitates both medical and dental care, there is an urgent need to establish a channel for medical-dental

collaboration that allows for team-based prevention and treatment of this condition.

CONCLUSION

In this report, close inter-university collaboration before surgical treatment of MRONJ helped the restoration of oral functions early after surgery. Such collaboration is expected to grow in the future to provide patient-centered, team-based care while also considering the training of maxillofacial prosthodontists to handle the expected increase in MRONJ patients.

ACKNOWLEDGMENTS

This work was partially supported by Female Faculty Promotion Program（FFPP）of Tokyo Medical and Dental University and Initiative for Realizing Diversity in the Research Environment.

This work was partially supported by the Japanese Dental Science Federation (JDSF-DSP1-2019- 208-1).

REFERENCES

1. Taniguchi H, Sumita YI, Otomaru T, Minamisawa N, Inohara K. Maxillofacial prosthodontics—current treatment and research. Prosthodont Res Pract 2008;7:132-134.
2. Yanagi A, Sumita Y, Hattori M, Kamiyanagi A, Otomaru T, Kanazaki A, et al. Clinical survey over the past 35 years at the clinic for maxillofacial prosthetics Tokyo Medical and Dental University. J Prosthodont Res 2018;62:309-312.
3. Shibahara T. Antiresorptive agent-related osteonecrosis of the jaw (ARONJ): A twist of fate in the bone. Tohoku J Exp Med 2019;247:75-86.
4. Ruggiero SL, Dodson TB, Aghaloo T, Carlson ER, Ward BB, Kademani D. American Association of Oral and Maxillofacial Surgeons' Position Paper on Medication-Related Osteonecrosis of the Jaws—2022 Update. J Oral Maxillofac Surg 2022;80:920-943.
5. Yoneda T, Hagino H, Sugimoto T, Ohta H, Takahashi S, Soen S, et al. Antiresorptive agent-related osteonecrosis of the jaw: Position Paper 2017 of the Japanese Allied Committee on Osteonecrosis of the Jaw. J Bone Miner Metab 2017;35:6-19.
6. Hellstein JW, Adler RA, Edwards B, Jacobsen PL, Kalmar JR, Koka S, et al. Managing the care of patients receiving antiresorptive therapy for prevention and treatment of osteoporosis: executive summary of recommendations from the American Dental Association Council on Scientific Affairs. J Am Dent Assoc 2011;142:1243-1251.
7. Ali IE, Sumita Y. Medication-related osteonecrosis of the jaw: Prosthodontic considerations. Jpn Dent Sci Rev 2022;58:9-12.
8. Madrid C, Sanz M. What impact do systemically administrated bisphosphonates have on oral implant therapy? A systematic review. Clin Oral Implants Res 2009;20:87-95.
9. Taguchi A, Shiraki M, Sugimoto T, Ohta H, Soen S, Society JO. Lack of cooperation between physicians and dentists during osteoporosis treatment may increase fractures and osteonecrosis of the jaw. Curr Med Res Opin 2016;32:1261-1268.